

# Computer Architecture



## CBM - Contributions



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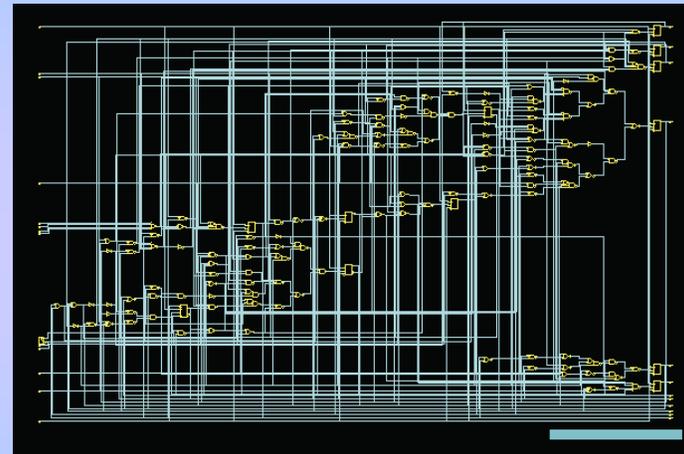


# Computer Architecture



## Research Areas

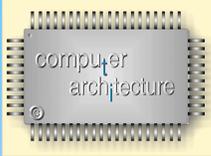
- Parallel- and Cluster computing
- innovative Computer Architectures and Parallel Computing
- low latency Interconnection Networks for Cluster Communication
- chip design using leading edge EDA Tools (proven cell based design flow)



## Actual projects

- ATOLL: Networkinterface for SANs
- OASE: Optical Datatransmission

SEED2002: Semi custom design flow  
Education

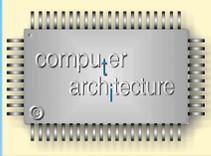


# OASE



## OASE - Optical Advanced SERIALIZER

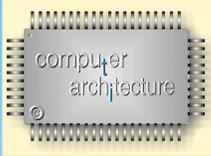




# Motivation



- Optical Interconnects deliver high bandwidth
- electro/optical conversion is still expensive  
(but will become cost effective if mass product)
- many application areas (2.5Gbit/s)
  - Gigabit Ethernet 1X, 10X      100m
  - Infiniband                              10-25m
  - ATOLL (SAN)                              1-5m
  - Hypertransport                              0,1-1,5m (in the box)
- Parallel Computing - Cluster Computing
- Physical Experiments (THC, Alice, CERN)



# Architecture of OASE



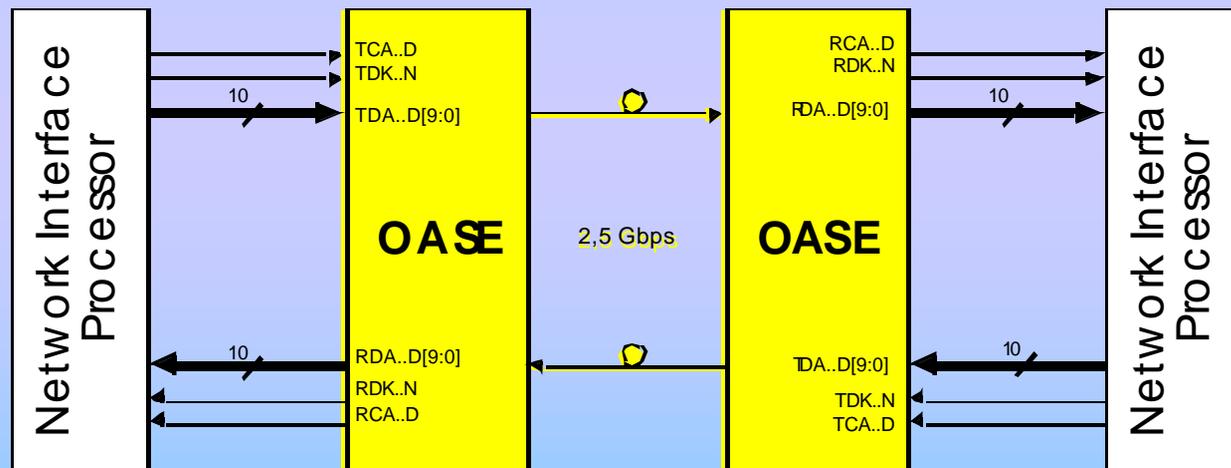
- Goal: fully integrated system
  - integration of all required parts for bidirectional optical transmission
  - serialization, encoding, deserialization, decoding
  - high speed serializer with laser driver and CML output
  - high speed deserializer with amplifier and photo detector input
- IP Cell for replication of multiple transmitter and receiver
- 0.18um UMC CMOS Technology
- cost-effective interface to VCSEL

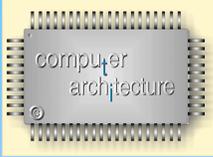


# OASE Architecture



- Chip Interface

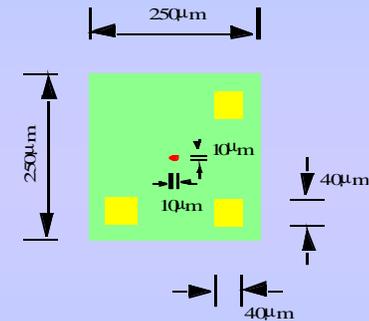
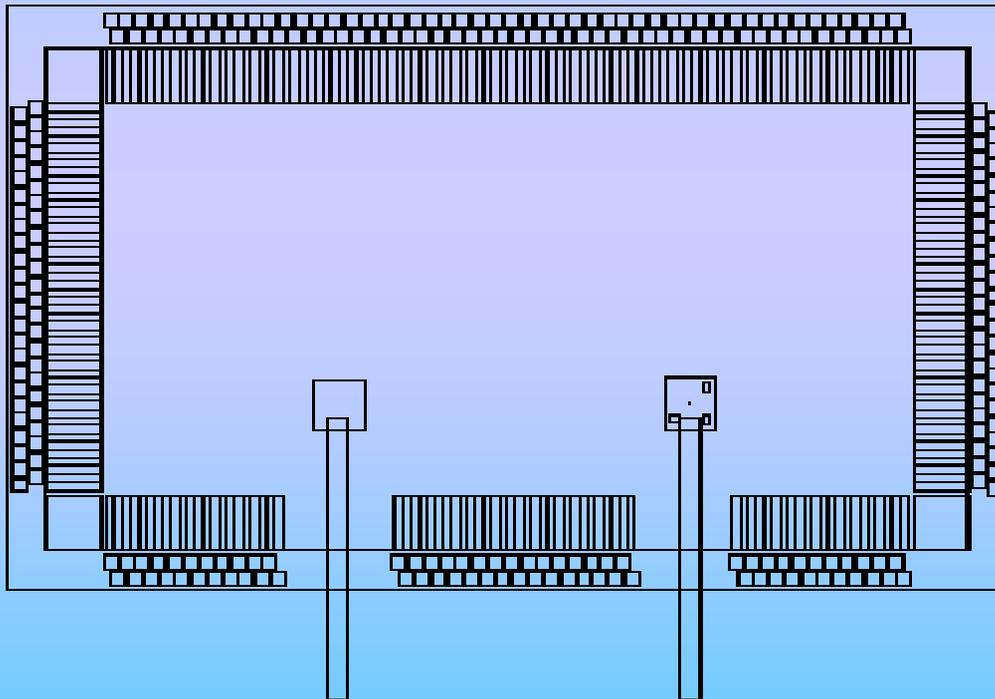


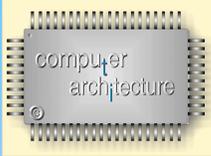


# Optomechanics of OASE



- Chip Top View

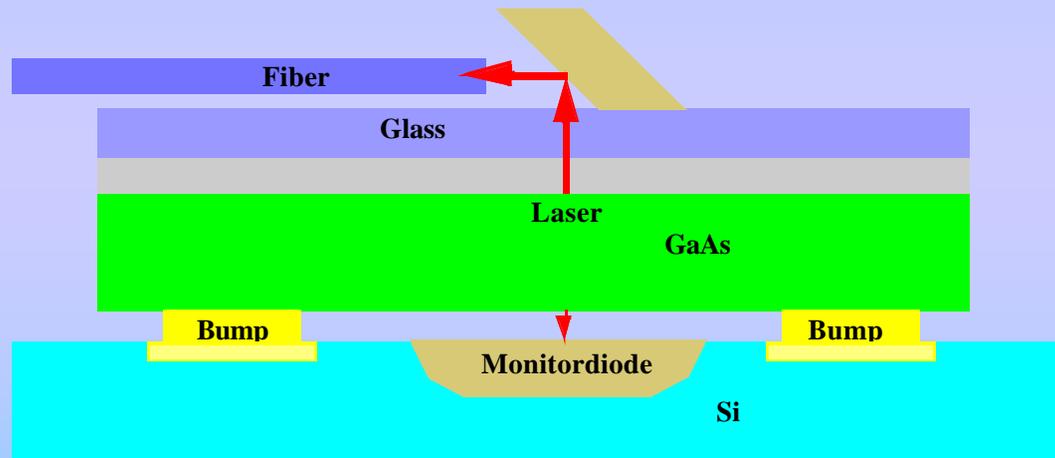




# Optomechanics of OASE



- Direct VCSEL Attachment



Patent pending



# State of Project



## Hardware

- ↗ silicon proven
- ↗ final measurements in progress
- ↗ => ready for volume production

## Optics

- ↗ concept of optomechanics (patent pending)
- ↗ first prototype tests and parameter selection